

REMARKS

Claims 1-14 are currently pending in the application. Reexamination and allowance of the claims are respectfully requested.

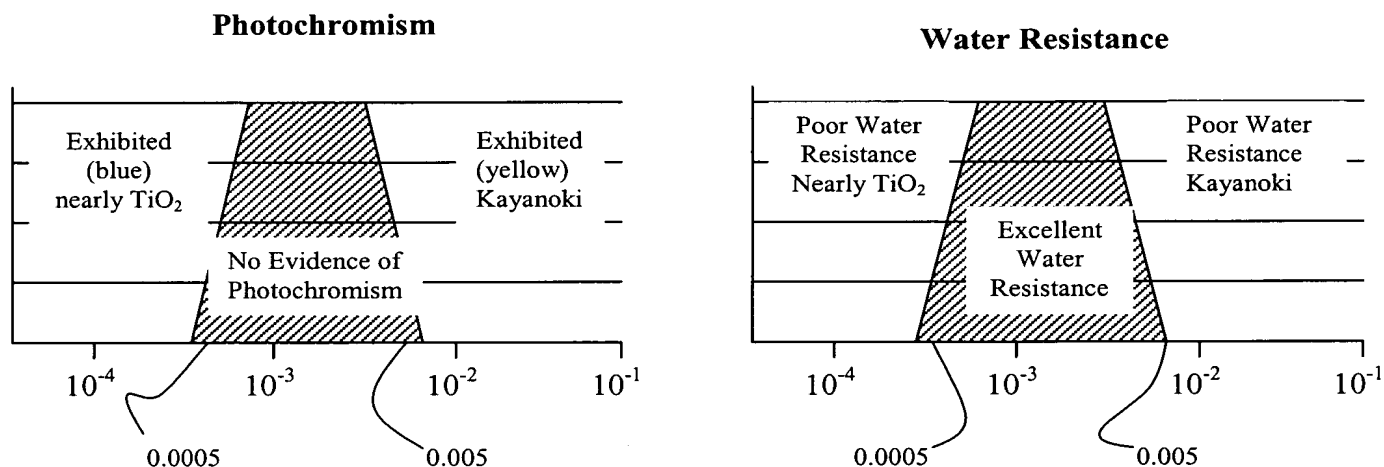
The Examiner has rejected claims 1-14 under 35 U.S.C. § 103(a) as being obvious over United States Patent No. 5,963,373 to Kayanoki (hereinafter "Kayanoki"). The Examiner asserts that Kayanoki substantially discloses the substrate, coating liquid, hard coat film, composite metal oxide particles, particle size limitations, matrix-forming component, organosilicon surface treatment, and anti-reflection film of the claimed invention, but does not specifically state that the weight ratio of the iron oxide to the titanium oxide may be 0.0005 to less than 0.005, or 0.001 to 0.0045. The Examiner concludes that it would have been obvious to one having ordinary skill in the art to have expected the same properties for a hard coat film comprising composite metal oxide particles of iron oxide and titanium oxide wherein the weight ratio of the iron oxide to the titanium oxide is 0.0045 or 0.0045 to less than 0.005. Applicants include herewith a Declaration Under 37 C.F.R. § 1.132 by inventor Mr. Hirokazu Tanaka. In the Declaration, Mr. Tanaka provides comparative data demonstrating the significance and unexpected results obtained when the weight ratio of $\text{Fe}_2\text{O}_3/\text{TiO}_2$ is within the claimed range. The data are summarized in Table A.

TABLE A

| | Sol | | Photochromism | High Refractivity | Scuffing Resistance | Appearance | Dye Affinity | Water Resistance | | Cloudiness | Stability | |
|----------------------|--|---|-----------------------|-------------------|---------------------|------------|--------------|------------------|-----------|------------|-----------|---------|
| | Fe ₂ O ₃ /TiO ₂ | SiO ₂ /(Fe ₂ O ₃ +TiO ₂) | | | | | | Coloring | Adherence | | 25 days | 45 days |
| Example 1 | 1/499 (0.002) | | none | o | A | o | o | none | o | o | o | x |
| Comp. Ex. 1 | 2/98 (0.02) | | exhibited | o | A | o | o | occurred | o | o | o | x |
| Example 2 | 1/499 (0.002) | | none | o | A | o | o | none | o | o | o | Δ |
| Example 3 | 1/499 (0.002) | 15/100 (0.15) | none | o | A | o | o | none | o | o | o | o |
| Example 4 | 1/999 (0.001) | | none | o | A | o | o | none | o | o | o | x |
| Comp. Ex. A | 4/9996 (0.0004) | | exhibited (blue) | o | A | o | o | none | x | o | o | x |
| Comp. Ex. B | 7/993 (0.007) | | exhibited (yellow) | o | A | o | o | occurred | o | o | o | x |
| Comp. Ex. C (new) | 3/9997 (0.0003) | | exhibited (blue) | o | B | o | o | occurred | o | o | o | x |
| Ex. A (new) | 5/9995 (0.0005) | | none | o | A | o | o | none | o | o | o | Δ |
| Ex. B (new) | 48/9952 (0.0048) | | none | o | A | o | o | none | o | o | o | Δ |
| Ex. C (new) | 15/9985 (0.0015) | | none | o | A | o | o | none | o | o | o | Δ |

As indicated in Table A, the hard coating film of Comparative Example C (the weight ratio Fe₂O₃/TiO₂ being 0.0003, lower than the claimed lower limit) has photochromism and glows slightly blue when irradiated by ultraviolet rays. The hard coating film of Comparative Example B (the weight ratio Fe₂O₃/TiO₂ being 0.007, higher than the claimed upper limit) shown in Table A, has photochromism and glows yellow when irradiated by

ultraviolet rays. The hard coating film of New Examples A, B, and C (the weight ratio $\text{Fe}_2\text{O}_3/\text{TiO}_2$ being 0.0005, 0.0048, 0.0015 in the range of the claims in the present invention) are free from photochromism, as shown in Table A. Accordingly, the composite metal oxide having the limited weight ratio (0.0005 to 0.005) of iron oxide to titanium oxide of the present invention is free from photochromism. Data relating to Photochromism and Water Resistance are graphically depicted below.



As can be seen in Table A, the water resistance of the hard coat films of Comparative Examples A, B, and C is poor. (Support for Water Resistance for the present invention is located in lines 14-20 on page 4 of the specification.) When the weight ratio of iron oxide to titanium oxide becomes lower, the composite oxide exhibits more of the characteristics of TiO_2 . As a result, the scuffing resistance of the hard film is insufficient.

Photochromism is different from the shielding of ultraviolet rays. In order to shield from ultraviolet rays, the use of TiO_2 is effective. However, the hard coating film

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containing TiO_2 is insufficient in water resistance, scuffing resistance, attrition resistance, dye affinity, and adherence.

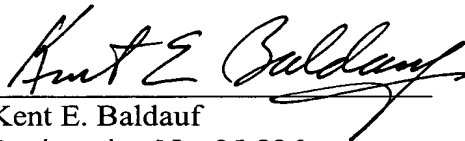
Hard coat films containing $\text{Fe}_2\text{O}_3/\text{TiO}_2$ out of the above-mentioned specific ratios exhibit photochromism. Therefore, the films glow yellow or blue at the irradiation of ultraviolet rays, and it is difficult for the discolored hard coat film to return to its original state. Furthermore, these films are insufficient in water resistance. In contrast, the hard coating films, which contain $\text{Fe}_2\text{O}_3/\text{TiO}_2$ at ratios specified within the present invention, are free from photochromism and exhibit sufficient water resistance. These effects are never obtained in Kayanoki. Therefore, the present invention is not obvious over Kayanoki and the rejection of claims 1-14 under 35 U.S.C. § 103(a) should be withdrawn.

Based on the foregoing remarks, reconsideration of the rejections and allowance of claims 1-14 are respectfully requested.

Respectfully submitted,

WEBB ZIESENHEIM LOGSDON
ORKIN & HANSON, P.C.

By



Kent E. Baldauf
Registration No. 25,826
Attorney for Applicants
436 Seventh Avenue
700 Koppers Building
Pittsburgh, PA 15219-1818
Telephone: (412) 471-8815
Facsimile: (412) 471-4094
E-mail: webblaw@webblaw.com